Primary Standards Laboratory

Metrology Program

Fact Sheet

Mass and Force

The Primary Standards Laboratory (PSL) maintains a variety of primary mass and force standards to assure accurate and traceable measurements for its customers. All primary mass and force standards are directly traceable to the National Institute of Standards and Technology (NIST). Mass certifications are available from 1 milligram to 64 kilograms.

When the highest accuracy is needed, groups of weights are intercompared using specified sequences that have high redundancy. A certification is issued giving the mass and associated uncertainty of each weight in the customer set.

Force is measured either against NIST-certified proving rings or by dead weight. Force can be measured in both compression and tension.

•MASS – BEST UNCERTAINTIES
Meet or exceed OIML Class E1 and AMSI/ASTM Classes 1, 1.1 tolerances up to 50 kg

•FORCE – BEST UNCERTAINTIES

Proving rings and load cells to 1000 lbf	± 20 ppm
Proving rings and load cells1000-100,000 lbf	± 200 ppm

Major Resources

- State-of-the-art laboratory environmental controls:
- 10,000 and 100,000 lbf Morehouse load frames
- 1,000 lbf Morehouse dead weight tester
- Mass comparators (partial list):
  - Mettler AX64004 - 100 µg resolution, 64 kg capacity
  - Mettler KA30-3/P – 2 mg resolution, 30 kg capacity
  - Sartorius CC10000U-L – 10 µg resolution, 10 kg capacity
  - Mettler HK1000 - 1 µg resolution, 1 kg capacity
  - Mettler AT106 – 1 µg resolution, 100 g capacity
  - Mettler UMT6 – 0.1 µg resolution, 6 g capacity
- Electronic top-loading balances to 60 kg capacity

Selected Accomplishments

- NIST/NVLAP (National Voluntary Laboratory Accreditation Program) accreditation to lab code 105002.
- Successful participation in mass and force round robins administered by the NCSL, NASA, and Lockheed Martin

Automatic Weighing of Kilogram Reference Standards

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